Spatial/ Surveying programs repositioning within new STEM Faculty at QUT

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Abstract: *Many of the undergraduate and postgraduate programs of the former Faculty of Built Environment and Engineering PLUS Faculty of Sciences and Technology are changing as a result of merging these two large organisations, with some disciplines relocating to faculties of Creative Industries and Health respectively. The new STEM precinct under construction has begun rising from the proverbial hole-in-the-ground. Existing Surveying and Spatial Sciences programs, assets and staff are being repositioned with the newly formed School of Earth, Environment and Biological Sciences.2011. Golden graduates morning tea organised by QUT Alumni. Technology upgrades to the Mapping Sciences lab benefits 3-D learning experiences. Second and third-year students are undertaking Work Integrated Learning (WIL) over the summer vacation period. Final year students recently presented capstone project presentations at mini-conference in the Gibson Rooms overlooking a vibrant Southbank and sparkling Brisbane River. Discussion on end of year graduation ceremony held at QPAC.*

Introduction to STEM at QUT

QUT's $230 million Science and Technology Precinct and Community Hub project is starting to take shape, as concrete floors and scaffolding rise out of the hole-in-the-ground of this landmark project. Gardens Point campus has been a hive of activity since Leighton Contractors completed structural works in a key phase of the development. This is the biggest project that QUT has ever undertaken in terms of the size of the building and its value and is progressing well towards its completion in 2012. It will become a landmark science and technology venture and it will significantly boost QUT's research profile in the science, technology, engineering and mathematics STEM areas.

This STEM Precinct is aiming for a 5-star Green-Star rating and in the energy area boasts an advanced gas-fired power generation and cooling system and up to 200KW of solar electrical generation. Community facilities will include a large public forecourt to the Old Government House Precinct, 270 parking spaces, a 50m FINA

(International Swimming Federation)-registered pool, a large gymnasium, food court, bookstore, function room and facilities for nearly 200 bicycles and showers.

On the teaching and learning front, the STEM Precinct will provide modern technology-rich social learning spaces which are becoming a very important part of our university fabric. Staff from the spatial sciences and surveying discipline have already been involved in experimental learning-technologies for teaching and social ”practice” spaces. This has been undertaken through a community of practice approach with selected enthusiast staff teams ahead of the STEM building precinct opening early 2013.

What is STEM about?

All over the developed world, governments are realising the importance of science and technology to their future directions and anticipated outcomes in the knowledge economy. The foundations of a successful scientific economy are laid by teachers in schools and universities whom inspire the new generation of scientists and technologists as well as laying the foundations of scientific literacy for those who may take their studies no further.

The commonly accepted global acronym STEM stands for science, technology engineering and mathematics, but it is about more than the teaching of these subjects in schools and formal learning setting. Improving the outcomes of a future so-called knowledge economy relies upon the broad mission to improve both achievement and enrolment with integrated STEM subjects at school, college and university.

Faculty and Program Re-positioning for STEM

The new STEM Faculty will reposition the disciplines of science, technology, engineering and mathematics at QUT. The creation of new schools and disciplinary groups will transform research, teaching programs and external engagement. The new STEM Faculty will establish a discipline-based research culture that sees QUT perform at or above world-class standard in niche research areas in all STEM discipline groups. The transformation of programs will engage students in regenerated courses that significantly increase QUT’s market share of high quality STEM students.

These courses will allow the application of STEM disciplines to real-world challenges. They will prepare graduates for future employment in areas of skills shortage by inspiring them to make a difference. The underpinning discipline research strength will allow the Faculty to be a lead partner in the inter-disciplinary thematic and grand challenge research programs of the new Institute for Future Environments and continue a strong commitment to the Institute of Health and Biomedical Innovation (IHBI) and other QUT Institutes.

The partnership will allow the Faculty to develop an innovative and integrated suite of undergraduate and postgraduate coursework programs for current and emerging workforce needs. These will serve the resources and environmental sectors, new jobs in the technology and services sectors, and support continued built environment and infrastructure development for rapid population and economic growth. This new organisational structure is expected to facilitate the primary goal of cultural change in

the way the Faculty does its business with strong and focused activity with STEM research and teaching outcomes.

In essence, the old Faculty of Built Environment & Engineering AND Science & Technology are undergoing structural organisation changes to reposition itself for the future STEM. The immediate changes will come into effect on 1January 2012 with the Surveying/Spatial discipline administratively and strategically re-locating to the newly formed School of Earth, Environment and Biological Sciences. The Head of School is Professor David Gust (Geosciences' background). Whilst the existing undergraduate curriculum already has embedded STEM learning structures in place, a future alignment with Earth and Geo-systems group is viewed as appositive for future survival and rejuvenating of the spatial science program at Gardens Point Campus. From 2013, the undergraduate programs will change significantly embracing this new STEM mission.

Technology upgrades completed for Mapping Sciences Laboratory

The third phase of upgrades to the technology rich Mapping Sciences lab environment was recently completed. This included the installation of a large-format Planar scientific instrument with dual LCD stereo-graphic monitors, connected through an AMC media controller and linked to the existing roof-mounted passive 3-D stereo-capable twin projection system and cinema-quality projection screen.

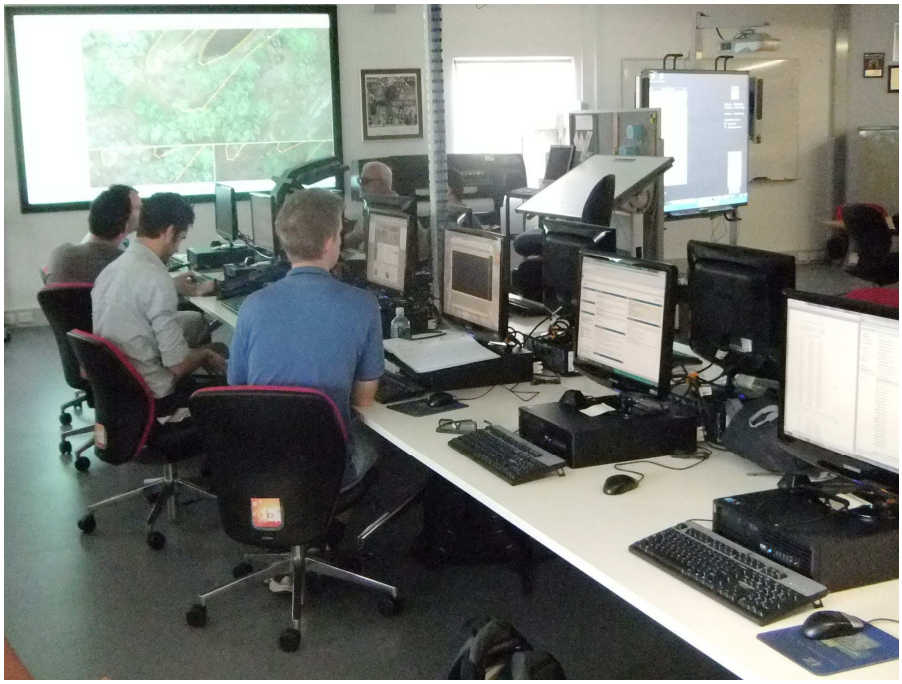

Figure 1: Part of the upgraded Mapping Sciences Technology lab at QUT.

Student learning has been enhanced with previous upgrade phase including seventeen moderately-high performance desktop computer workstations with Samsung LCD 3-D monitors capable of high (and variable) image refresh rates and linked with human interface Wireless glasses specifically for stereo-graphic viewing experiences. The lab space also supports a mobile SMART-board interactive touch-board/projector for small group learning.

Figure 2 Lab Supervisor Mr Ian Pagan and photogrammetry student Mr Ben Hauser using the Planar system for editing ortho-air-images for Samford digital-mapping learning project.

Immediate benefits of these upgrades have been realised by first, second and third year students in this vibrant learning technology space. The faculty has invested in the future of this facility with Spatial Sciences (broadly) been identified as a discipline engaging in technology-embedded teaching and learning spaces with staff involved in foundation pilot workshops discussing classroom/ facility design ahead of the STEM building futures.

QUT Alumni News

The latest edition of Alumni magazine was recently published. The alumni magazine, *QUT Links*, is distributed over 100,000 alumni. Keep up to date with alumni achievements and news about the university. Further details available at internet resource page http://www.qut.edu.au/alumni/alumni-magazine The 2011 Golden Graduates Reunion was a great success with the event held on Saturday, 22 October 2011. This signature event provides an opportunity for Alumni who graduated in **1961 and earlier** to reunite with friends from their college days. Alumni are considered a QUT Golden Graduate, if they completed studies **during or before 1961** at one of QUT's predecessor institutions, the Central Technical College, Queensland Teachers Training College, Domestic Science College or Brisbane Kindergarten Training College.

WIL- Work Integrated Learning in 2011

Second and third-year students will be undertaking Work Integrated Learning (WIL) over the summer vacation period. We look for support from surveying and spatial practitioners to assist current students in obtaining relevant industrial experiences. To be eligible for graduation, students have to meet a minimum requirement of 90 days industrial experience.

Figure 3: Second year QUT survey students setting out horizontal road curves across Anzac Park, Toowong

The WIL unit aims to provide students with first-hand experience of the workplace. Experiences may include aspects of attendance, participation, observation, and reflection. These structured activities allow students to develop a range of understandings of the workplace settings and the practice of their chosen profession. The content of the unit is based around aspects of: experience in, and of, the workplace; the professional application of theoretical knowledge; the business of practice; its interaction with and within society and practice generally. The teaching and learning content in the WIL unit is predominantly delivered in the workplace, usually in the office of a professional practice, under the supervision of a practicing professional. The workplace learning is supplemented with a number of on-line teaching and learning resources, and a handful of specialised lectures and support tutorials in the first few weeks of a semester.

Final Year Student Project Presentations

Final- year Spatial Science and Surveying student projects were presented at a Mini-conference on the afternoon of Wednesday 19 October in the Gibson Rooms overlooking a vibrant Southbank and sparkling Brisbane River. This capstone project unit requires the final year students to produce a quality 4000-5000 words journal article to the faculty-level performance expectations utilising standardised criterion referenced assessment. Additionally, the students provide a formal seminar presentation of 12-15 minutes duration summarizing outcomes of their results or research efforts. The audience this year included some YPs, other academic and professional staff, invited guests and other early-year students.

Presentation topics included

- The Qld Shortage of Surveyors and learning from other regional marketing.
- Current status of Electronic Access for Registry Lodgment (EARL) program.
- Challenges of Subterranean Survey & Mapping of O-Building, Gardens Point.
- Applied GNSS case-study to rural cadastral survey: Revising Coordinate theory.
- SunPOZ Application and Heighting Conformance- Woollawin station case-study

- Risk and Professional Indemnity – Triggers for Australian Surveyors.
- Transitioning to Formal Land Rights - A Case Study on the Papua New Guinea context focusing on overlap in Tenure.
- Experiments with Terrestrial Laser Scanner application in Quarry-waterbody inference.
- Summary of recent developments with Australian Spatial Data Infrastructure *(ASDI)*
- Summary of QUT Contributions to *MapMyTown* 2010- the Bell, Darling Downs experiences.

Figure 4 Mr Robert Webb chairing the mini-conference in the QUT Gibson rooms.

Further information on the min-conference can be obtained from QUT digital repository through the internet link http://eprints.qut.edu.au/46548/

Graduation Ceremony 2011

Monday evening, December 12, 2011 should see the end-of-year graduation ceremony held at the Queensland Performing Arts Complex (QPAC) at South Brisbane. Expected Graduations from all Bachelor of Urban Development (Spatial Science) and legacy surveying programs at this end-of-year event should number 11 supplemented by the 3 spatial science/surveying graduates from the July (mid-year) event. On the surface this appears to be the smallest number of graduates in two decades. However, next year we expect a larger wave of graduates with about 19 expected to complete in calendar year 2012. First-year intake numbers were previously reported as 35 commencements with the 2011 commencing entrance level raised (unexpectedly) to O.P.11 band. A majority of these first year students have progressed through to the end of first-year.

An informal round-table future-focussed discussion with almost all potential 2011 graduates indicated most have secured full-time employment before the end of final semester. An interesting employment indictor shows that just over half of the 2011 graduates have employment with mining and resource sector companies, a noticeable increasing trend for spatial destinations. Staff from QUT congratulates all students whom have reached one of life's milestones in realizing the end of their university degree journey. Well- done!!!

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